An induction regulator for an internal combustion engine.

An induction regulator for an internal combustion engine for improving the flow of fuel to match engine requirements.

In one embodiment the regulator comprises a perforated element in the form of a metallic gauze (11) which is supported and surrounded by a frame (9). The frame (9) has two straps (13) which serve as attachment means for locating the regulator in the manifold. A reservoir (19) having an open top and secured to the frame (9) is disposed adjacent the gauze (11) on the downstream side thereof and serves to retain excess unvapourised fuel.
The present invention relates to an induction regulator for an internal combustion engine.

To ensure correct operation of an internal combustion engine for example a petrol engine for motor vehicles it is important that the fuel and air are homogeneously mixed and correctly proportioned. This task is assigned to the carburettor and numerous attempts have been made to ensure this. However, under certain circumstances excess unvapourised fuel may be present in the induction manifold, for example during cold starting or due to excessive movement of the accelerator pedal by the driver. This excess fuel is invariably wasted and thus leads to excessive fuel consumption and may give rise to the emission of exhaust gases in amounts greater than the permitted levels.

It is an aim of the present invention to compensate for variations in the fuel air mixture fed to an internal combustion engine from the carburettor in order to avoid unvapourised fuel passing into the engine and being wasted.

According to the present invention there is provided an induction regulator for an internal combustion engine, the regulator being adapted to be disposed in the inlet manifold of the engine downstream of the carburettor and comprising a perforated element allowing passage of fuel air mixture therethrough and an open top reservoir for retaining excess unvapourised fuel.

Preferably, the perforated element comprises a metal gauze bounded by a frame whose shape corresponds with that of the inlet manifold into which the regulator is to be fitted. Preferably the gauze is planar and
disposed at an angle to the manifold wall. The angle may be in the range of 13° to 25° but is preferably 18° when the regulator is positioned at a bend in the manifold for example where the inlet gases change direction between moving vertically and moving horizontally as is the case with a down draught carburettor.

Means are provided for securing the regulator in the manifold and these preferably comprise a pair of metallic strips which depend from the frame bounding the gauze. The free ends of the strips may be bent outwardly at right angles so that they may be clamped between mating flanges of the manifold. For example, where the carburettor flange connects to the inlet manifold flange.

The open top reservoir comprises a rectangular tank which is secured to or forms part of the frame and the open top is positioned adjacent the gauze on the downstream side thereof. The tank preferably extends across the width of the gauze in a central position leaving unrestricted passage through the gauze both above and below its longitudinal edges. The arrangement is such that unvapourised fuel collects in the tank and when the engine requires extra fuel it vapourises from this tank passing initially upstream through the gauze covering the open top of the tank and then downstream through the gauze positioned on either side of the tank. It is believed that the gauze serves to improve atomisation of the fuel air mixture and by virtue of the turbulence created generates a swirling action in the inlet manifold which leads to improved combustion.

The regulator in accordance with the invention has the advantage that it compensates for irregularities in the supply to and demand for fuel from the engine and thus leads to improved fuel consumption, reduced exhaust pollution, and better fuel atomisation/vapourisation.
The present invention will now be described further, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 illustrates the regulator in accordance with the invention located in an induction manifold;

Figure 2 is an end view of the regulator shown in Figure 1;

Figure 3 is a perspective view of the regulator of Figure 1 and 2;

Figure 4 is a front view of an alternative embodiment of an induction regulator in accordance with the invention; and

Figure 5 is a cross-section of the regulator of Figure 4 taken on the section IV-IV.

Referring now to Figures 1 to 3 an induction regulator, generally indicated by the reference numeral 1, is shown disposed in an induction manifold downstream of a carburettor 5. The regulator 1 is positioned at the bottom of the downdraught section of the manifold 7 and is angled across the corner where the manifold changes direction from a substantially vertically directed air flow to a substantially horizontally directed air flow. As shown the regulator comprises a frame 9 which bounds a metallic gauze 11 and which acts to support the gauze 11 around its periphery. Two strips of metal 13 depend from the frame and serve as location straps for the regulator 1. The ends of the strips may be bent outwardly at right angles to permit them to be clamped between a flange 15 of the inlet manifold 3 and a flange 17 of the carburettor 5. The frame 9 is disposed at an angle of 72° to the strips 13.

An open top reservoir 19 is secured to the frame and its edges surrounding the open top are formed with a lip 21 which serves to support the gauze 11. The
reservoir 19 is elongate and is positioned centrally across the width of the gauze 11, between the points where the strips 13 connect to the frame 9. The gauze 11 extends over the open top of the reservoir 19. The reservoir serves as a trip tank to catch and retain an unvapourised petrol in the induction gases.

Preferably the regulator assembly is made of copper which is a good conductor of heat so that fuel vapourisation is aided/accelerated. The size of the gauze is dependent upon the size of the inlet manifold to which the regulator is to be fitted and the mesh size of the gauze is likewise varied to optimise the air flow requirements through the regulator. The capacity of the reservoir may be varied to suit the induction requirements of different capacity of engines.

Whilst the embodiment of Figures 1 to 3 has been described with respect to a perforated element employing a gauze, the gauze may in certain circumstances be replaced by a metallic plate which has a plurality of through holes. In this way the required number of holes may be formed in the plate to suit the induction requirements.

In the preferred construction the gauze or perforated plate is disposed at an angle of 18° to the axis of the manifold on the downstream side of the regulator. In alternative constructions the angle may vary within the range of 13° to 25°.

Referring now to the figures 4 and 5 an alternative embodiment of the regulator is illustrated. The regulator 31 comprises a perforated metallic plate 33, which has a plurality of holes 35 and which is supported on the edges 37,39 of a reservoir 41. The plate is to be supported at an angle and this is accomplished by arranging for the edges 37,39 to be of different heights with respect to the base 43 of the reservoir 41. The
reservoir has an open top which is covered by part of the perforated plate 33. Mounting straps 45 depend from the reservoir 41 and in practice form part of the reservoir. The free end of the straps are bent outwardly so that they can be clamped between manifold flanges in the same manner as described with reference to the embodiment of figures 1 to 3. The sides 49 of the reservoir taper inwardly to avoid the outer walls of the manifold. Because a plate is used in place of a gauze no support for the peripheral edges is required, the strength of the plate providing its own support.

Both embodiments of the invention influence the passage of fuel air mixture to the engine in a similar way. Firstly, the perforated plate or gauze acts to improve atomisation and hence the mixing of the fuel air as it passes through from the carburettor to the engine. Secondly excess unvapourised fuel present in the inflowing air stream contacts the gauze and collects in the petrol trap reservoir, thus excess fuel is prevented from entering the engine. Thirdly, when the engine operating conditions demand an increased quantity of petrol the fuel contained in the petrol trap reservoir vapourises, it is believed under the influence of suction in the manifold and passes out of the reservoir through the gauze and down into the engine, thus the device operates to smooth out irregularities in the fuel air mixture.

The induction regulator may be formed integrally with the carburettor or induction manifold and it will be apparent that whilst the regulator has been described with reference to its use at the bend in the inlet manifold this is not essential and the device can be fitted in a position where the air flow is moving in a straight line, be it vertical or horizontal.
1. An induction regulator for an internal combustion engine, the regulator being adapted to be disposed in the inlet manifold of the engine downstream of the carburettor and comprising a perforated element allowing passage of fuel air mixture therethrough, characterised in that the regulator further comprises an open top reservoir (19,41) for retaining excess unvapourised fuel.

2. An induction regulator as claimed in claim 1, characterised in that the perforated element (11) comprises a metal gauze bounded by a frame (9).

3. An induction regulator as claimed in claim 1, or 2, characterised in that the perforated element is a metallic plate (33) having a plurality of through holes therein.

4. An induction regulator as claimed in any of claims 1, 2 or 3, characterised in that the perforated element is planar and circular in outline, and is disposed at an angle to the axis of the inlet manifold.

5. An induction regulator as claimed in any preceding claim, characterised in that a pair of metallic strips (13,45) connect with the perforated element (11,33) and constitute means for securing the regulator in the inlet manifold.

6. An induction regulator as claimed in any preceding claim, characterised in that the open top reservoir (19,41) comprises a substantially rectangular tank which extends across the width of the perforated element and is positioned with the open top adjacent to and downstream of the perforated element.

7. An induction regulator as claimed in claim 6, characterised in that the reservoir (19) is positioned centrally with respect to the perforated element (11)
leaving an unrestricted passage through the perforated element both above and below the longitudinal edges (21) of the reservoir.

8. An induction regulator as claimed in claims 6 or 7, when appendent to claim 3, characterised in that the reservoir (41) is secured to the metallic plate (33).

9. An induction regulator as claimed in claims 6 or 7, when appendent to claim 2, characterised in that the reservoir (19) is secured to or forms part of the frame (9).